

EPA STRATEGIC INFORMATION PLAN: A FRAMEWORK FOR THE FUTURE

JULY 29, 2002





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

THE ADMINISTRATOR

Foreword

I am pleased to present the Environmental Protection Agency's Strategic Information Plan. This plan charts the course the Agency will follow in the coming years to increase the public's access to high-quality real-time environmental data.

President Bush has laid out a vision to improve the management and performance of the federal government and provide the public with access to information that they need, when they need it. EPA's Information Plan provides the necessary framework to meet the President's goal of providing government and citizens with fast, relevant, and integrated information about environmental and public health conditions, trends, and potential threats. The plan will help us meet the goal of linking program performance and environmental results, thus making programs and efforts more transparent to the public. It will also help us address complex environmental problems by giving us a clearer picture of the state of the environment.

At a time when the already enormous amount of electronic information is growing every day, our information management efforts will help us manage that information and achieve our goal of delivering valuable environmental information, including measurable results, to the American people.

Christine Todd Whitman
Administrator



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
ENVIRONMENTAL INFORMATION

Dear Reader:

As the Environmental Protection Agency's (EPA) Chief Information Officer, I am committed to establishing a system that advances the creation, management and use of information as a strategic resource at EPA. I am pleased to release EPA's Strategic Information Plan as a road map to help us achieve this goal of managing our Agency's information and resources.

EPA's goal is to protect human health and the environment, and the Information Plan will help us meet this goal by improving our access, analysis, and dissemination of quality information. The plan charts the course the Agency will follow in the coming years to actively and energetically design and implement systems and services that are aimed at streamlining data collection, making the Internet the method of choice of reporting and exchanging information, and making more effective use of the information we collect.

The new vision for EPA's information management will be to provide government and citizens with fast, relevant, and integrated information about environmental and public health conditions, trends, and potential threats. The plan stresses the need to streamline and strengthen the Agency's information management infrastructure to improve the effectiveness and efficiency of our operations and programs. The Strategic Information Plan is a high-level framework that will guide the Agency to improved communications capabilities.

The plan highlights six information management goals: improve the use of environmental information, collect appropriate data, strengthen EPA's information infrastructure, enhance access to information, adopt an Agency-wide approach to using information to make management decisions, and invest in human capital. I believe these goals provide the framework to meet the President's goal of an E-government by laying the foundation for improving, integrating and increasing the use of the nation's environmental information.

We are committed to moving forward with our state, tribal, and other partners as we pursue the President's goal of transforming the government into a truly electronic government. Implementing and improving our information plan is a continuous process, and through the help of our partners we will overcome our challenges and develop more comprehensive approaches to environmental data and information management.

Sincerely,

A handwritten signature in black ink, which appears to read "K. Nelson", is written over a horizontal line.

Kimberly T. Nelson
Assistant Administrator and
Chief Information Officer

Acknowledgement

The Environmental Protection Agency's Administrator and Chief Information Officer (CIO) extend their appreciation to the individuals who devoted their time and talent to developing this Strategic Information Plan. The dedication of these individuals enabled the timely and thoughtful development of this framework for the future management of EPA's information. The following group of principal contributors includes representatives from the majority of the Agency's offices:

Jay Benforado, OPEI
Wendy Cleland-Hamnett, OEI
Tom Curran, OAR
Peter Durant, ORD
Samantha Fairchild, Region 3
Jim Hanlon, OW
Walt Kovalick, OSWER
Lisa Lund, OECA
Margaret Schneider, OEI
MaryEllen Weber, OPPTS
David Ziegele, OCFO

The Office of Environmental Information served a leadership role in bringing together participants from across EPA to develop this plan. This leadership team included:

Oscar Morales, OEI/OIC, Director of the Collection Strategies Division
Brion Cook, OEI/OTOP, Director of the Information Policy and Planning Division
Doreen Sterling, OEI/OIC, Associate Director of the Collection Strategies Division
Joe Sierra, OEI/OIC, Chief of the Information Strategies Branch

Thanks also go to the OEI team who managed the project and helped to develop the plan based on input from the primary contributors:

John Moses, OEI/OIC, Project Manager
Shivani Desai, OEI/OIC
Constance Downs, OEI/OIC
Patrick Grimm, OEI/OIC
Amy Haseltine, OEI/O

Table of Contents

Executive Summary	iii
Introduction	1
Vision	2
Guiding Principles	2
Goals	3
Goal 1: Use	4
Goal 2: Data	6
Goal 3: Technology	9
Goal 4: Access	12
Goal 5: Governance	14
Goal 6: People	17
Situational Analysis Capability Summary	18
Conclusion	21

List of Figures

Figure A – Strategic Information Plan Conceptual Map	iv
Figure B – Using Information as a Strategic Tool	5
Figure C – Data and Information Quality Life Cycle	7
Figure D – Network Overview	10
Figure E – Enterprise Architecture Program – Conceptual Framework	15
Figure F – EPA Situational Analysis Capability – Schematic Diagram	20

EXECUTIVE SUMMARY

The U.S. Environmental Protection Agency (EPA) faces many challenges in managing its vast information resources to support its mission of protecting human health and the environment. Increasingly, EPA must address complex environmental problems that cut across media and geographic locations, requiring information that is integrated across its traditional media-oriented programs.

In the current world of e-government, EPA must respond to growing public demands for easily accessible, integrated information on environmental conditions, and must take full advantage of advances in information technology (IT) to collect and exchange information with its partners and stakeholders. At the same time, the Agency must also be responsive to the compelling needs of homeland security, preparing for possible terrorist threats to environmental facilities and public health.

The Agency responded to these challenges by convening an Advisory Group to develop a new vision for managing the Agency's information over the next two to four years:

Provide government and citizens with fast, relevant, and integrated information to better protect human health and the environment.

To achieve this vision, EPA must use information as a strategic resource, working closely with other Federal agencies, States, Tribes, and other partners and stakeholders. The Agency also must deliver its information operations and services as efficiently as possible, while enhancing its ability to provide useful information. This includes actively supporting the President's Management Agenda and Federal e-government projects to better leverage limited resources. This *Strategic Information Plan* is an important step in fulfilling the Agenda and e-government initiatives.

This document outlines six over-arching information management goals:

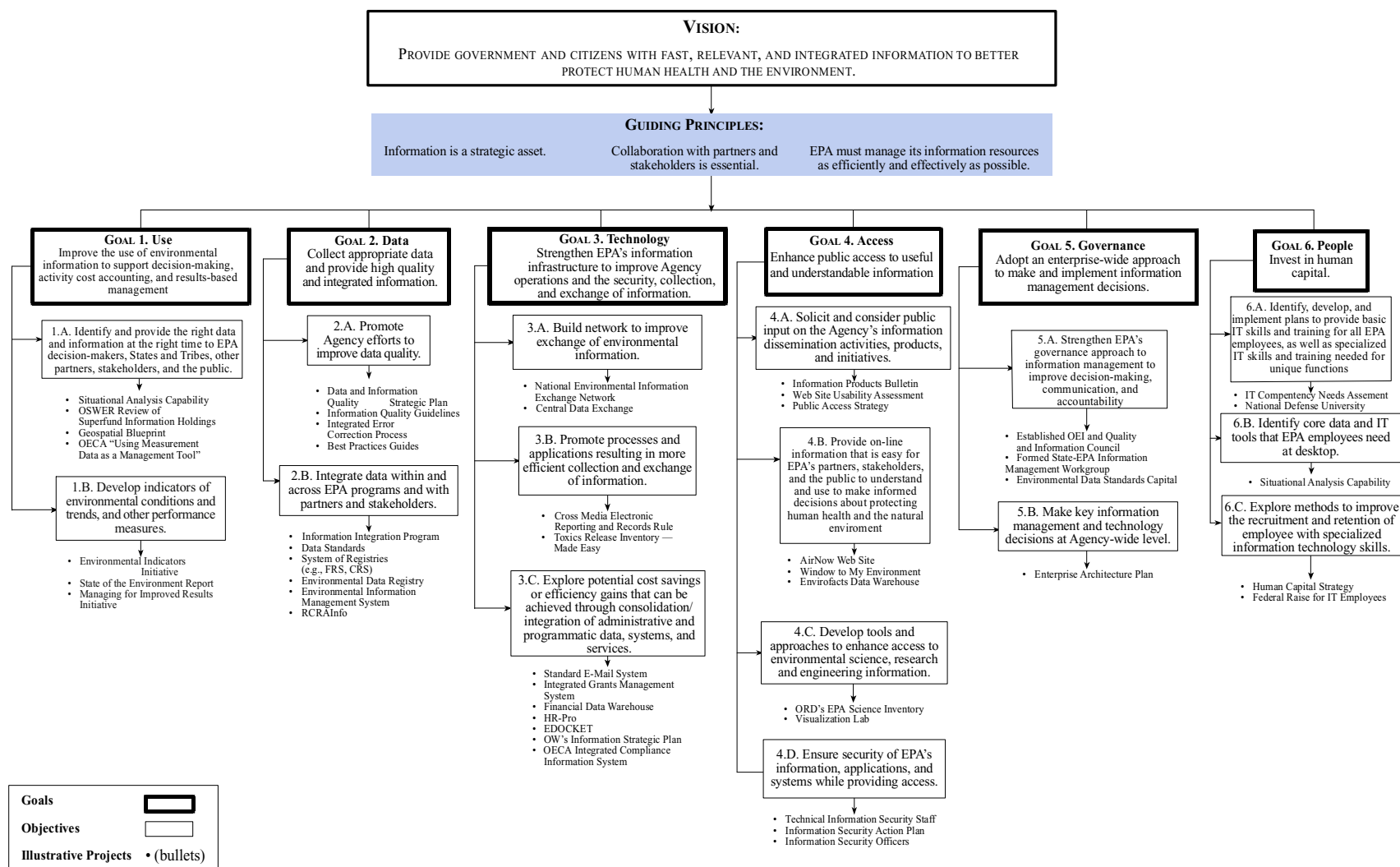
- (1) **Use:** Improve the use of environmental information to support decision-making, activity cost accounting, and results-based management;
- (2) **Data:** Collect appropriate data and provide high-quality and integrated information;
- (3) **Technology:** Strengthen EPA's information infrastructure to improve Agency operations and the security, collection, and exchange of information;
- (4) **Access:** Enhance public access to useful and understandable information;
- (5) **Governance:** Adopt an enterprise-wide approach to make and implement information management decisions; and
- (6) **People:** Invest in human capital.

Together, these goals and the accompanying objectives will guide the way in which EPA collects, manages, disseminates, and invests in information. Significantly, the Agency has made progress toward achieving some of these goals, including:

- establishing the State-EPA Network to improve the collection and exchange of environmental information;
- supporting projects to improve integration of environmental data (e.g., data standards, system of registries) to create a single, integrated, multi-media core of environmental data and tools (e.g., Window to my Environment);
- launching an Enterprise Architecture program to ensure that EPA's technical infrastructure is aligned with the Federal Enterprise Architecture and Agency business processes and data needs; and
- Creating a Situational Analysis Capability to enhance the use of environmental information for decision making and results-based management.

With continuing support from senior leadership, EPA will succeed in fulfilling its vision for information management and transform how the Agency and its partners protect human health and the environment.

Figure A —Strategic Information Plan Conceptual Map



INTRODUCTION

The U.S. Environmental Protection Agency (EPA) faces many challenges that require it to develop better integrated, more comprehensive approaches to environmental data and information management. These challenges include:

- addressing complex environmental problems that cut across media and geographic locations;
- addressing the compelling needs of homeland security and preparing for potential terrorist threats to public health and the environment;
- meeting growing public demands for high-quality information;
- linking program performance and environmental results;
- using advances in information technology (IT) to enhance EPA's business practices and information services; and
- ensuring that the Agency's data, applications, and IT infrastructure are secure.

Meeting these challenges requires EPA to re-examine how it collects, manages, and uses information; how it operates its information systems; and how it makes IT investment

decisions. In addition, several reviews of EPA's information management by the U.S. General Accounting Office (GAO) and the National Academy of Public Administration (NAPA) called for the development of a comprehensive plan that would present a vision for enhancing the Agency's information resources and a detailed strategy for achieving that vision.^{1,2,3}

In response, EPA initiated a multi-phase effort to develop an Agency-wide information vision and strategy. In the first phase, EPA's Office of Environmental Information (OEI) completed a preliminary assessment of how the Agency manages its information (described in the *Strategic Choices* white paper). Following this assessment, OEI convened an Advisory Group of senior managers from EPA program and regional offices to discuss the most pressing information issues and to begin developing a new vision for the future.⁴ These discussions covered a wide range of information management issues from the content and quality of the Agency's information; to information policies, technologies, operations, and services; to human resources. The Advisory Group prepared a draft *Strategic Information Plan*, providing a framework for addressing EPA's major information challenges in the coming years. EPA's Chief Information Officer (CIO) reviewed and revised this plan to reflect her vision for information management.

¹ U.S. General Accounting Office, *EPA is Taking Steps to Improve Environmental Information Management, but Challenges Remain*, GAO/RCED-99-261, Washington, D.C., September 1999.

² U.S. General Accounting Office, *Major Management Challenges and Program Risks—Environmental Protection Agency*, GAO-01-257, Washington, D.C., January 2001.

³ National Academy of Public Administration, *Transforming Environmental Protection for the 21st Century*, November 2000, www.napawash.org/napa/

⁴ The Advisory Group included representatives from the Office of Air and Radiation (OAR); the Office of Prevention, Pesticides, and Toxic Substances (OPPTS); the Office of Solid Waste and Emergency Response (OSWER); the Office of Water (OW); the Office of Research and Development (ORD); the Office of the Chief Financial Officer (OCFO); the Office of Enforcement and Compliance Assurance (OECA); the Office of Policy, Economics, and Innovation (OPEI); and Region 3 (lead Region for information issues).

VISION

EPA's vision for information management is to provide government and citizens with fast, relevant, and integrated information about environmental and public health conditions, trends, and potential threats. To achieve this vision, the Agency will use the latest advances in IT to manage its information resources with maximum efficiency. Additionally, EPA will pursue an enterprise approach to provide employees with the necessary skills to deliver high-quality, timely, and meaningful information. As EPA integrates its vision elements into its business functions, the Agency will be even better prepared to deliver on its mission of protecting human health and the environment.

Vision

Provide government and citizens with fast, relevant, and integrated information to better protect human health and the environment.

Guiding Principles

- A. Information is a strategic asset.
- B. Collaboration with partners and stakeholders is essential.
- C. EPA must manage its information resources as efficiently and effectively as possible.

GUIDING PRINCIPLES

The following principles guide EPA's approach to achieving its information vision.

A. Information is a strategic asset.

Information and IT are essential in carrying out EPA's mission of protecting human health and the environment. The Agency's success depends on the availability of high-quality, timely, and reliable information. This information is needed to:

- develop environmental quality standards;
- promulgate environmental regulations;
- issue permits and monitor compliance;
- track environmental conditions and trends; and
- assess programmatic performance.

In order to maintain and enhance the value of its information assets, EPA must continue to improve data quality, implement data standards, enhance the compatibility of data systems, and identify and fill major data gaps.⁵ At the same time, EPA must stay abreast of new technologies and invest in technologies that can best support the Agency's business processes and changing information needs.

B. Collaboration with partners and stakeholders is essential.

EPA's ability to protect human health and the environment depends on strong collaboration with the Agency's partners and stakeholders. State and Tribal agencies:

⁵ U.S. General Accounting Office, *Major Management Challenges and Program Risks—Environmental Protection Agency*, GAO-01-257, Washington, D.C., January 2001.

- collect much of the data that EPA uses;
- play a key role in implementing programs and monitoring compliance;
- help disseminate environmental information;
- provide important scientific and technical expertise in identifying and addressing emerging environmental problems.

Federal partners:

- collect complementary information;
- implement a range of related environmental statutes; and
- require information from multiple sources to support better decision-making.

EPA must continue to strengthen its partnerships to ensure that the data it collects, uses, and disseminates are accurate, reliable, and available when needed. Collaboration will continue to be a key in carrying out the Agency's mission and realizing its information vision.

C. EPA must manage its information resources as efficiently and effectively as possible.

EPA must manage its information resources more effectively in order to:

- address both single-media and cross-media environmental problems;
- meet growing public demands for timely, high-quality information;
- provide greater accountability for the Agency's performance and results; and
- support homeland security and fully integrated e-government.

Advances in IT and the expansion of the Internet provide new opportunities to collect, analyze, and integrate information and deliver timely, meaningful information to EPA's partners, stakeholders,

⁶ Stakeholders include groups such as the regulated community, industry, non-governmental organizations, academia, and the general public.

and the public. These IT advances may also help EPA reduce the information collection and reporting burden it imposes on States and the regulated community. EPA must work closely with its State and Tribal partners, other Federal agencies, and stakeholders⁶ to ensure that the Agency's business processes and IT infrastructure produce more capable, streamlined, or more efficient operations to support EPA's business functions.

GOALS

In order for EPA to achieve its information vision, the Agency must refocus its efforts in a number of different information management areas—from the collection, integration, and exchange of high-quality information; to the management of IT investment decisions; to ensuring a well-trained workforce. The following six goals describe the specific aims EPA will strive to achieve in the coming years:

Goals

1. **Use:** Improve the use of environmental information to support decision-making, activity cost accounting, and results-based management.
2. **Data:** Collect appropriate data and provide high-quality and integrated information.
3. **Technology:** Strengthen EPA's information infrastructure to improve Agency operations and the security, collection, and exchange of information.
4. **Access:** Enhance public access to useful and understandable information.
5. **Governance:** Adopt an enterprise-wide approach to make and implement information management decisions.
6. **People:** Invest in human capital.

Each goal is described in more detail below, along with specific objectives for achieving the goals and examples of activities that are planned or under way. A number of challenges remain and the Agency must continue to work closely with its partners and stakeholders to develop the most effective approaches for addressing them.

Goal 1. Use

Improve the use of environmental information to support decision-making, activity cost accounting, and results-based management.

EPA must ensure that the right types of information are available to:

- meet statutory responsibilities;
- measure environmental performance; and
- make well-informed environmental decisions.

The Agency must continue to engage its partners and stakeholders in determining what information is really needed, to eliminate any unnecessary redundancies in data collection and to fill any critical data gaps. Since so many of EPA's responsibilities are delegated to the States, any efforts the Agency pursues to fill data gaps must be carefully planned and coordinated with State and Federal partners. At the same time, the Agency must ensure that no unnecessary data collection requirements are imposed on States, Tribes, or the regulated community, and must continue working to reduce the Agency's overall information collection and reporting burden. In addition to collecting or accessing the right type of data and information, EPA must enhance its ability to integrate and interpret its scientific and other data to support performance-based management and multimedia approaches to protecting the environment.

Goal 1 Objectives and Illustrative Projects

EPA will pursue the key objectives described below to improve the Agency's, partners', and stakeholders' overall ability to use environmental information. Examples of current activities that support these objectives are provided as well.

Identify and provide the right data and information at the right time to EPA decision-makers, States and Tribes, other partners, stakeholders, and the public.

- ▶ Working in partnership with program and regional offices, OEI is leading an effort to develop a Situational Analysis Capability. For instance, a desktop will organize and display environmental and other relevant information in a single, easy-to-access site that can be tailored to the user's specific preferences (e.g., public access, emergency response, rule making). Initially, the Agency will focus on presenting critical information needed by emergency responders, via a secure site, for internal EPA users and other governmental partners. Another module will focus on public access, ensuring that citizens can easily find, access, and review information about environmental conditions at the national, State, and local level (i.e., a virtual state-of-the-environment report), as well as obtain information on environmental incidents, how to respond to them, and how they impact the public's health.
- ▶ The Office of Solid Waste and Emergency Response (OSWER) recently conducted a comprehensive review of the Superfund program's information holdings to ensure that the information collected meets the needs of program managers. This study responded to recommendations issued by Resources for the Future in a 2001 report entitled The Future of Superfund. By focusing on the information used by program managers, OSWER hopes to reduce the information burden on Regional site managers (e.g., on-scene coordinators).

- The ability to analyze, compare, integrate, and display environmental information by geographic location is becoming critical to tackling environmental problems that cut across jurisdictional boundaries. EPA is currently developing a Geospatial Blueprint to improve the Agency's geospatial data, tools, and applications. This Blueprint will provide a framework for making greater use of geospatial information across the Agency. EPA prepared an initial draft of the Blueprint in March 2002.
- Making better use of EPA's data to evaluate and improve performance is essential in determining how best to use available funding and staff resources. The Office of Enforcement and Compliance Assurance (OECA) has developed the report Using Measurement Data as a Management Tool to help senior managers evaluate the performance of national and regional compliance and enforcement programs. It includes a set of performance-based questions, relevant

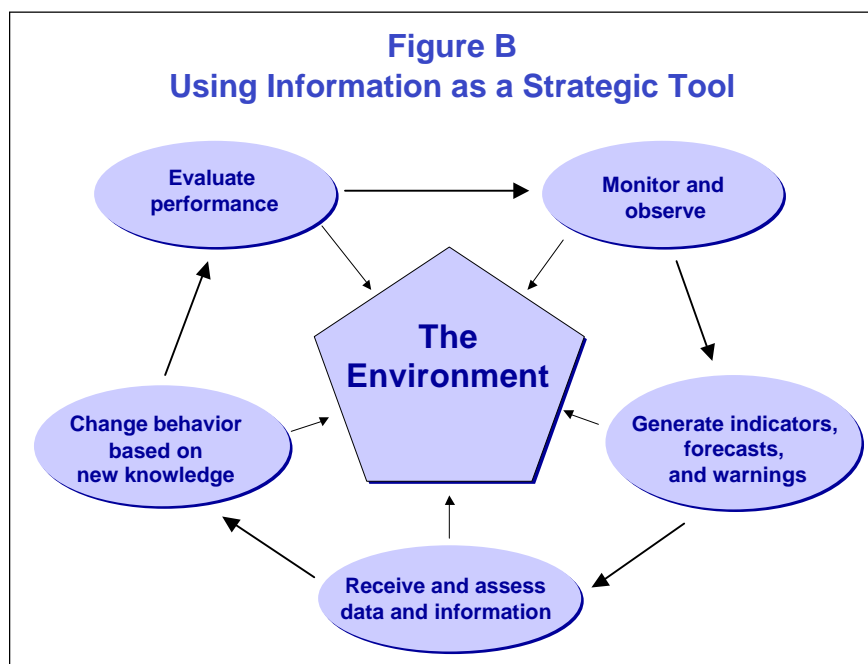
measurement data, and programmatic recommendations based on existing performance data.

Develop indicators of environmental conditions and trends and other performance measures.

- Environmental indicators are an important tool for simplifying, analyzing, and communicating information about environmental conditions and trends. EPA recently launched an Agency-wide Environmental Indicators Initiative and is now in the process of examining environmental indicator work that is under way across the Federal government. This effort will lead to the development of a State of the Environment report by the fall of 2002.
- The Office of the Chief Financial Officer (OCFO) is leading a complementary effort to identify appropriate measures of Agency performance. This effort—the Managing for Improved Results Initiative—will help EPA offices

develop the measures (e.g., output and outcome measures) that are most useful in evaluating how well they are doing in achieving intended

Public and private entities use information to monitor and observe environmental health; generate indicators, forecasts and warnings; receive and assess data and information; change behavior based on new knowledge, thereby impacting the environment.



goals and objectives. This initiative will include an examination of the Agency's current planning, budgeting, and priority-setting processes and focus on improving EPA's ability to manage its programs for improved results.

Continuing Challenges

EPA will continue to face a number of challenges in ensuring that the right information is available for environmental decision making and performance-based management. Examples of these challenges include the following:

- Providing environmental managers and policymakers with the types of information they need to make well-informed decisions (e.g., location-based, performance-based, or multimedia information).
- Developing easy-to-use information tools for use by decision makers and the public, while also maintaining the flexibility to address *ad hoc* questions about environmental issues.
- Reaching agreement among EPA and its many partners and stakeholders about what types of data and information are most critical as the basis for environmental indicators of conditions and trends.
- Reducing information collection and reporting burdens, while also ensuring the availability of the data and information needed to fulfill EPA's environmental protection mission.
- Developing the scientific understanding necessary to establish clear links between programmatic activities and environmental outcomes.

Goal 2. Data

Collect appropriate data and provide high-quality and integrated information

The demand for high-quality, integrated information is greater than ever before. The public has an interest in obtaining easy-to-understand health and environmental information, and the EPA and its partners have a mandate to address complex environmental problems. In addition, EPA recognizes that information can add value and that using information in the right ways can be a key strategy for environmental protection. Using information in ways that can cause changes in behavior can supplement our regulatory and enforcement approaches to environmental protection. EPA must ensure that the data it collects, generates, and uses are accurate, representative, reliable, and rapidly available; and implement procedures for identifying and quickly correcting any errors that may occur.

The Agency must also be able to draw connections among the various types of data it collects to provide a comprehensive picture of environmental conditions or performance at the national, regional, State, Tribal, or facility level. Geographic data, various environmental and health data, demographic/census data, and data on other indicators of public health and environmental conditions are essential for supporting informed environmental decision making. Obtaining comparable and compatible data requires coordination between and among the program and Regional offices that are developing the monitoring and data collection efforts. These programs are delegated to regulatory partners or responded to by the regulated community, which can lead to important differences in implementation. It is essential to find ways to integrate and

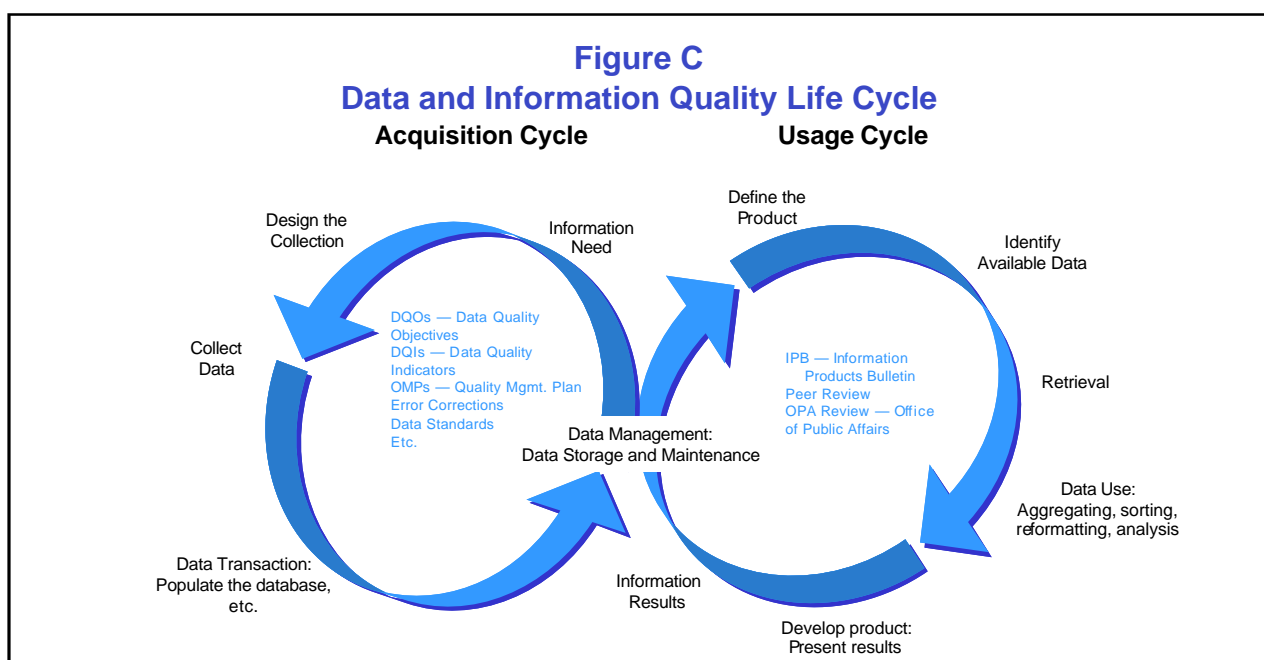
analyze environmental data at a variety of levels to understand the state of the nation's environment and to enlist the full support of EPA's partners and stakeholders in protecting and enhancing the environment.

Goal 2 Objectives and Illustrative Projects

The Agency has identified critical objectives to set priorities for collecting the most appropriate data and provide high-quality and integrated information. The following objectives and supporting projects illustrate the path EPA is taking to collect and provide relevant and high-quality data and information that will most effectively serve its partners, stakeholders, and the public.

Promote Agency efforts to improve data and information quality.

- ▶ The Agency has established a Quality System that applies to the collection and use of environmental data, either by EPA staff or by organizations that receive EPA funds (e.g., grantees, peer-review studies). Quality System requirements can be found in Agency orders, manuals and regulations, which represent the building blocks of the Data and Information Quality Strategic Plan and the Information Quality Guidelines.
- ▶ The Agency is developing a Data and Information Quality Strategic Plan, which represents a first step in determining how best to improve EPA's data and information. This plan recommends the formation of an Agency-wide network to facilitate collaboration among programs and Regions in improving data quality. It also calls for a standardized approach for assessing data quality and greater emphasis on quality-related activities.
- ▶ Also, EPA is developing Information Quality Guidelines to respond to a new Office of Management and Budget (OMB) requirement. These guidelines will focus on how the Agency uses data to generate information and disseminate it to the public. Draft guidelines were



announced in the *Federal Register* on April 30, 2002. Once finalized, these guidelines will apply to all the information EPA disseminates beginning in October 2002.

- ▶ The Agency has worked in partnership with States to develop an online integrated error correction process. This process allows EPA's partners, stakeholders and the public to notify the Agency if they identify any errors in EPA's data and information. EPA then sends reported or suspected error notifications to the responsible program, Regional office or State agency for review and needed correction. This process will help ensure that the data and information that EPA posts on the Internet are accurate and reliable, as well as provide EPA's partners and stakeholders with an easy way of alerting the Agency about potential data errors or misinterpretations.
- ▶ OEI is preparing a series of Best Practices Guides that describe methods and procedures for planning, designing, developing, reviewing, releasing, and maintaining environmental information products. These Guides and a related EPA Intranet Web site draw from the wealth of Agency experience in developing information products and provide practical suggestions for EPA information product developers and managers.

Integrate data within and across EPA programs and with partners and stakeholders.

- ▶ EPA launched the cross-Agency Information Integration Program (IIP) to foster the development of an information integration strategy that identified tools and approaches that can be used across the

Agency and by States to support improved decision-making and increase efficiency. This program culminated in the creation of a Model for Information Integration (M4I), which provides a framework for the Agency's integration efforts and establishes a vision for EPA's target architecture.

- ▶ The Agency is developing data standards to promote the use of common data element definitions and formats. These data standards will help integrate information from different databases and sources. Thus far, the Agency has approved seven data standards (i.e., biological taxonomy, chemical identification, date, facility identification, latitude/longitude, permitting, and Standard Industrial Classification/North American Industry Classification System [SIC/NAICS]) and is supporting the development of five additional data standards (i.e., enforcement/compliance, Tribal identifier, reporting water-quality results for chemical and microbiological analytes, contact, NPDES).
- ▶ Also, EPA is developing a system of registries that serve as repositories for commonly used data element definitions and metadata. The registries will be available for EPA programs and regions, as well as for information exchange with the Agency's partners and stakeholders. Existing registries include the Terminology Reference System; the Substance Registry System, which includes chemical and biological registries; the Facility Registry System; and the Environmental Data Registry (EDR). EDR contains descriptive information about the data managed by the Agency, with special emphasis on the

data elements used by EPA's national systems. EDR is the primary tool used by the Agency for implementing data standards. Collectively, these integration efforts will enable the exchange of data critical to the development of the Situational Analysis Capability.

- ▶ ORD has developed the Environmental Information Management System (EIMS), which provides descriptive information (metadata) about various data sets, databases, documents, models, multimedia projects, and spatial information. This metadata enables users to identify and use the data that are most useful to them.
- ▶ OSWER created RCRAInfo, which streamlines and combines the information in the Resource Conservation Recovery Information System and the Biennial Reporting System and provides an example of how EPA is working with States to promote integration at the programmatic level.

Continuing Challenges

Developing high-quality, integratable information will continue to pose a number of challenges for EPA. Examples include the following:

- Assuring that the information collected by EPA and its partners and stakeholders is appropriate, documented, and of consistently high quality.
- Ensuring the utility and availability of environmental information to support both its original intended use as well as the broader uses available through integration with other information.

- Providing needed ambient air- and water-quality monitoring data through data exchange partnerships with environmental stakeholders.
- Developing the organizational and technical infrastructure to allow EPA, States, Tribes, and other partners and stakeholders to integrate and exchange environmental information easily and seamlessly across media and geographic and political boundaries.

Goal 3. Technology

Strengthen EPA's information infrastructure to improve Agency operations and the security, collection, and exchange of information

The increasing complexity of many environmental issues requires EPA to collect and integrate data from a variety of sources at the State, Tribal, and Federal level as well as by media sector or geographical area. Fortunately, advances in technology are making it possible to collect, analyze, and integrate information more easily and effectively than ever before. At the same time, given the rapid changes in technology, information systems can quickly become obsolete, and must be designated to be more flexible and modular.

EPA must examine both the long-term viability and the implementation time required for new information systems and applications before making new investments. In addition, the Agency must ensure that new technologies do not place unnecessary burdens on States or the regulated community. Success in building the most appropriate information infrastructure will

depend largely on EPA's ability to work in close collaboration with other Federal, State, and Tribal partners, and support the President's Management Agenda.

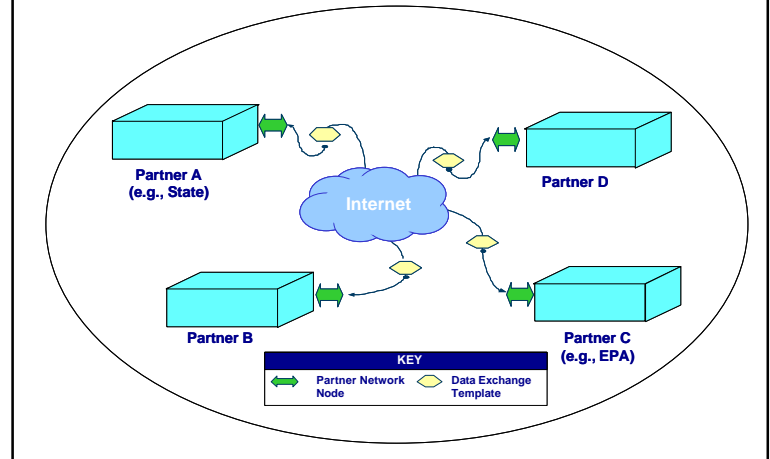
Goal 3 Objectives and Illustrative Projects

Implementing the key projects below will enhance and support the collection and exchange of information.

Build a network to improve the exchange of environmental information.

- ▶ Efforts to develop a network that allows the States and EPA to share information are well under way through the National Environmental Information Exchange Network (NEIEN or Network). This Network will facilitate environmental information sharing between EPA, States, Tribes, localities, and other entities. The network will improve data quality since it will rely on the use of data standards and automated data checks. EPA and the States anticipate that the Network infrastructure will be nearly complete and accept major data flows by September 2003.
- ▶ An important component of the NEIEN is the Agency's Central Data Exchange (CDX). CDX provides a central point within EPA for collecting, exchanging, and streamlining many distinct data collection processes. It will also serve as the Agency's connection to the Network (known as EPA's "node" on the Network). It will be linked to EPA's registries, which will further enhance the Agency's integration efforts. CDX is expected to accept one major data flow from data reporters on behalf of each program office by September 2003, such as National Emission Inventory data

**Figure D
Network Overview**



(Office of Air), Permit Compliance System data (OECA), and Toxic Release Inventory data (OEI).

Promote processes and applications that result in the more efficient collection and exchange of information.

- ▶ EPA is moving forward on its proposed Cross-Media Electronic Reporting and Records Rule (CROMERRR) rule, which would establish criteria for voluntary electronic environmental reporting and allow the regulated community to submit required reports to EPA electronically. This rule is a key to enhancing the Agency's ability to foster electronic government operations with an expected completion in 2003.
- ▶ Another effort designed to simplify and improve reporting is the Toxics Release Inventory—Made Easy (TRI-ME). This interactive expert system helps the regulated community understand Emergency Planning and Community Right-to-Know Act (EPCRA) reporting obligations as well as helping them

complete the required reporting forms. Such expert systems can enhance compliance and reduce the public's time and costs involved in reporting data to EPA.

Explore potential cost savings or efficiency gains that can be achieved through the consolidation or integration of administrative and programmatic data, systems, and services.

- ▶ In support of the President's Management Agenda, EPA has initiated a number of efforts to reduce costs, increase efficiency, and enhance government service to the citizen. For instance, the Agency recently implemented a standard e-mail system, improving the ability of EPA employees to exchange mail and documents. In addition, the Agency has developed several consolidated administrative systems, such as the Integrated Grants Management System (IGMS), the Financial Data Warehouse (FDW), and HR-Pro, a system for managing Human Resources.
- ▶ OEI and EPA program offices will consolidate seven docket facilities into one physical location in August 2002. This is the next step in a process that began with the integration and automation of business functions through a state of the art imaging and electronic document management system, the EPA Docket system (EDOCKET). EDOCKET was launched in April 2002 and provides citizens with the ability to review, retrieve, and comment on the Agency's rule-makings and non-regulatory activities. It streamlines government operations and is an example of EPA's efforts to meet the objectives of the Federal government's e-government rule-making initiative (e-government defined

as being focused on business to government, citizen to government, and internal efficiencies).

- ▶ Program offices also are exploring ways to improve the efficiency of their information processes. For example, OW is currently developing the OW Information Strategic Plan (ISP) to improve its collection and exchange of high-quality information. OECA is also developing an Integrated Compliance Information System (ICIS) to streamline access to EPA compliance information.

Continuing Challenges

EPA faces important challenges in ensuring that its technical infrastructure provides efficient and effective services and supports the delivery of high quality information. Examples of these challenges include the following:

- Reaching agreement among EPA and its partners on the most appropriate policies, procedures, standards, and technologies to exchange information.
- Ensuring adequate investment in EPA's information infrastructure, operations, and services over the long-term.

Goal 4. Access

Enhance Public Access to Useful and Understandable Information

Technology has created new public demands on government to provide more information and services 24 hours a day, 7 days a week, and in a variety of formats (e.g., the Internet, facsimile, voicemail, toll-free phone lines, and print). In addition, there is an expectation that government business should be conducted electronically, not only with the public, but also within EPA, with our State and Tribal partners, the regulated community, and with other Federal, State, and local government agencies. EPA is increasingly expected to follow the private sector's lead in implementing IT to transact government business, improve customer service, and provide transparent access to environmental information. The general public wants and expects the Federal government to provide easy-to-use information and services electronically.⁷ To meet this demand, EPA will need to identify and set priorities among the various e-government services that it could potentially provide, and based on this assessment, develop innovative information systems and Web-based tools that meet public needs for meaningful environmental information.

Goal 4 Objectives and Illustrative Projects

EPA is currently pursuing the following objectives with the goal of enhancing access to information. The illustrative projects that support these objectives demonstrate the work that has already begun in pursuit of this goal.

Regularly solicit and consider public input on the Agency's information dissemination

activities, as well as on new information products and initiatives.

- ▶ EPA developed the Information Products Bulletin (IPB) to notify stakeholders and the public of significant, upcoming EPA information products and inform them about opportunities to provide input on the development of these products.
- ▶ EPA has also initiated an effort to assess the usability of EPA Web sites. This effort is designed to determine whether existing sites provide the kinds of information that partners and stakeholders want and need. Usability assessments have already been completed for a number of Web sites, including the EPA homepage, Window to My Environment (WME), Envirofacts, and education sites for children, students, and teachers.
- ▶ Building on input from partners and stakeholders, EPA is now developing a Public Access Strategy. This strategy will lay out the direction and scope of the Agency's public access activities, including the development and evaluation of information products and services.

Provide online information that is easy for EPA's partners, stakeholders, and the public to understand and use to make informed decisions about protecting human health and the natural environment.

- ▶ Web-based sites such as AirNow, WME, and Envirofacts will help make EPA's vast array of environmental information more accessible and usable to the general public. Tools such as these serve as trail-blazers leading to the development of an interface for the Situational Analysis Capability tool.

⁷ Sharrard, J., J.C. McCarthy, M. J. Tavila, J. Stanley. "Sizing U.S. e-Government," *The Forrester Report*, August 2000, p. 6.

- ▶ The Office of Air and Radiation launched the AirNow Web site, which provides the public with easy access to national air quality information, including daily air quality forecasts and real-time air quality data for more than 100 cities across the United States. This information is routinely used by the nation's weather reporters in issuing air quality alerts. In the future, access to AirNow may be broadened to include access via wireless technology such as Personal Digital Assistants (e.g., Palm Pilots) and cellular telephones.
- ▶ The Window to my Environment (WME) Web site provides environmental information to help the public make informed decisions. The site currently contains geospatially linked information from multiple government sources on issues such as air and water quality, watershed health, and access to government services.
- ▶ EPA's Envirofacts Data Warehouse provides the public with a single point of access to information from EPA databases on topics such as air quality, drinking water, toxic releases, hazardous wastes, industrial facilities, Superfund sites, and Agency grants and funding. This information can be requested via online queries, retrieved from several databases simultaneously, and presented in the form of integrated maps and reports.

Develop tools and approaches to enhance access to environmental science, research, and engineering information.

- ▶ ORD has led the development of the EPA Science Inventory to enhance access to information about EPA program, regional, and ORD science

projects, as well as to foster internal coordination among these projects. This inventory should help the Agency and its partners and stakeholders plan and coordinate future scientific research more effectively.

- ▶ In an effort to facilitate public access to information about environmental status, trends, and drivers, EPA has developed the Visualization Lab (VisLab). This office designs and presents complex environmental data sets in the form of easily interpretable images. Such visualization techniques are essential in EPA analysis and decision making as well as in communicating environmental information visually to policymakers and the public in ways that are easy to understand and use.

Ensure the security of EPA's information, applications, and systems, while providing appropriate access.

- ▶ The security of the Agency's information is critical to its mission of protecting human health and the environment. Over the past several years, the Agency has devoted extraordinary attention and resources to improving the technical information infrastructure and building the management framework for an improved security program. In 2000, OEI established the Technical Information Security Staff (TISS) to review Agency security accomplishments, manage EPA's security efforts, and examine future security governance. EPA also developed the Information Security Action Plan to guide the Agency's revised security program and respond to GAO's July 2000 audit. Finally, the Agency designated program and regional Information Security Officers

(ISOs). ISOs are responsible for coordinating security activities, providing guidance, reviewing security practices, and informing colleagues of their information security responsibilities.

- ▶ As part of the National Environmental Information Exchange Network Implementation Plan, EPA and its State and Tribal partners have defined levels of security that must be met for the exchange of information across the network. These levels range from Level 1: Public information, available to all users without authentication, to Level 4: Information requiring the highest level of non-repudiation as well as confidentiality and integrity checks.

Continuing Challenges

EPA faces important challenges in ensuring that timely, meaningful information is readily available to its partners, stakeholders, and the public.

Examples of these challenges include the following:

- Meeting growing public interest in environmental information that is easy to use and understand.
- Presenting and visualizing environmental data in ways that make it easier to use and understand.
- Providing public access to a wide range of environmental information, while also taking steps that discourage the use of this information in ways that could harm either the environment or public safety (e.g., the industrial production or release of hazardous chemicals).

- Meeting the growing need for storing and exchanging information with our environmental partners and stakeholders in a secure IT infrastructure.

Goal 5. Governance

Adopt an enterprise-wide approach to make and implement information management decisions.

The increasingly complex issues facing EPA today require better-integrated, cross-media approaches to environmental protection. Such a shift from traditional single-media approaches will entail significant changes in how the Agency collects, analyzes, and uses information and require major cultural changes in how programs interact and relate to one another and to outside partners and stakeholders. EPA's media offices have traditionally taken the lead in designing and developing their own information systems and applications to satisfy specific statutory responsibilities (e.g., under the Clean Air Act, the Clean Water Act, etc.). As a result, while the Agency as a whole maintains a wealth of environmental data, these data are not always consistent or easy to integrate across EPA programs. The result is a mix of separate "stove-pipe" information systems. Adopting an enterprise-wide approach to information management will allow EPA to make key information, technology, and funding decisions at an Agency-wide level and improve the efficiency and effectiveness of its governance structure and operations. As EPA participates in other Federal e-government projects, the Agency's enterprise approach must expand to include other Federal agencies. Such an approach will also reduce burden on Federal, State, and Tribal partners, as well as improve the Agency's

ability to centrally track the performance of its various information technology efforts.

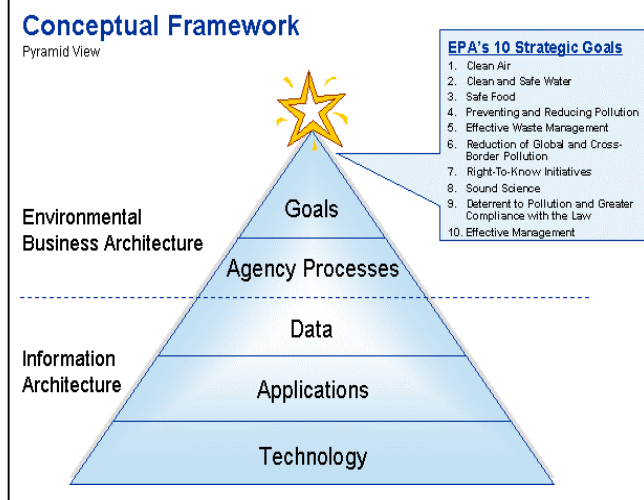
Goal 5 Objectives and Illustrative Projects

EPA is actively pursuing the following objectives and projects to enhance the Agency's enterprise governance approach to making and implementing information management decisions.

Strengthen EPA's governance approach to information management to improve decision-making, communication, and accountability.

- ▶ Over the last two years, EPA has taken several significant steps to improve information planning and decision making across the Agency. In October 1999, OEI was formed to consolidate Agency-wide information collection and policy functions, provide technology operations and services, and provide public access to EPA's wide array of data and information. The Agency also formed the Quality and Information Council (QIC) composed of senior program and Regional managers, which provides expertise and guidance to the CIO in addressing Agency-wide information management issues.
- ▶ EPA and State environmental agencies—through the Environmental Council of the States (ECOS)—formed the Information Management Workgroup (IMWG) to improve information management between EPA and its State and Tribal partners. The IMWG plays an important role in defining data standards and in designing the National Environmental Information Exchange Network (NEIEN). For instance, the IMWG established the Environmental Data Standards Council in November 1999 to facilitate the efficient sharing of environmental information

Figure E
Enterprise Architecture Program – Conceptual Framework



through the development and implementation of data standards.

Make key information management and technology decisions at an Agency-wide level.

- ▶ EPA has developed and is now enhancing the Enterprise Architecture Plan. This planning process will yield and provide a description of the Agency's business processes, data applications, technical infrastructure, and security architecture and provides an initial framework for designing and managing IT infrastructure to meet the Agency's business goals and functions. EPA will coordinate its Enterprise Architecture Plan internally and with Federal, State, and Tribal partners. EPA will release a revised Enterprise Architecture Plan, with a target environmental information architecture by September 2002, including the subarchitectures of business, data, applications, and technology/security.

Continuing Challenges

EPA faces significant challenges in developing an enterprise-wide approach to information management. This is due in large part to the way in which the Agency's programs have evolved over the years to address media-specific statutory responsibilities. Examples of these challenges include the following:

- Developing a culture that fosters a Federal-wide and Agency-wide perspective and rewards cooperation and collaboration across Federal agencies, programs and regions, particularly in terms of strategic planning, priority-setting, and budgeting.
- Identifying impediments to integrating the increasing role of information and IT into EPA's organizational culture and operations.
- Improving decision-making processes to ensure that EPA's information systems planning and development efforts are closely linked to the Agency's budgeting and investment control processes.

Goal 6. People

Invest in human capital.

As with other public and private sector organizations, EPA faces continual challenges in recruiting and retaining employees with appropriate skills in data analysis and information technology. It is particularly difficult to hire high-tech employees who are attracted to the private sector by higher salaries and rapid advancement opportunities. GAO has recommended that EPA "align its human capital policies and practices to best support its mission and help meet its strategic goals and objectives."⁸ Specifically, EPA must:

- identify the skills it needs to accomplish the Agency's strategic goals and objectives;
- ensure that its workforce is diverse and appropriately trained; and
- work to retain good employees.

This involves hiring, training, and retaining employees who are skilled in data analysis, information management, and computer science (from network configuration and maintenance, to information security, to Web design and management). EPA must also offer continuing education opportunities to help employees stay abreast of cutting-edge technologies, provide career enhancement opportunities, and initiate programs to foster high employee morale and productivity.

Goal 6 Objectives and Illustrative Projects

EPA is committed to investing in its workforce to realize its information vision. The Agency continues to demonstrate this commitment by engaging in the following objectives and projects.

Identify, develop, and implement plans to provide basic IT skills and training for all EPA employees, as well as specialized

⁸ U.S. General Accounting Office, *EPA is Taking Steps to Improve Environmental Information Management, but Challenges Remain*, GAO/RCED-99-261, Washington, D.C., September 1999.

IT skills and training needed for unique functions (e.g., knowledge management, information management, GIS, and data mining).

- ▶ OEI recently completed an Agency-wide effort to assess and characterize the information technology competencies of senior managers who are responsible for their organization's information management projects, policies, and resources. The initial report was completed in early 2002. Next steps will focus on the development of a plan for information management training to address apparent skills gaps.
- ▶ The Office of Human Resources and Organizational Services (OHROS) is leading an effort with OEI to identify IT competency needs to meet the Agency's mission.
- ▶ Also, EPA has partnered with National Defense University (NDU) to offer EPA employees advanced courses in information management, strategic planning, and technology to EPA employees. These intense one-week courses train students in a variety of IT competencies as well as provide an introduction to the best information practices across the government.

Identify and provide the core data and information technology tools that all EPA employees need at the desktop.

- ▶ The proposed Situational Analysis Capability will be a major step toward providing core data and information to EPA employees as well as to the Agency's partners and stakeholders.

Explore methods to improve the recruitment and retention of employees with specialized information technology skills.

- ▶ The Agency has developed a Human Capital Strategy, which includes strategic goals to ensure that all EPA employees are competent, appropriately trained, and motivated to achieve superior results.
- ▶ The Office of Personnel Management authorized pay increases for Federal IT employees, effective January 2001. This pay hike was designed to make the Federal civil service more competitive in the labor market for skilled IT workers, to bolster the recruitment and retention of technology workers, and to encourage younger IT employees to join the Federal government.

Continuing Challenges

EPA faces important challenges in ensuring that its workforce is appropriately trained in information management and technology. Examples of these challenges include:

- Providing EPA personnel with the necessary educational and training opportunities to stay abreast of rapid advances in technology.
- Attracting, hiring, and retaining employees with the requisite skills in data analysis/interpretation and information management and technology.
- Providing information and IT tools to EPA employees and partners as new environmental protection challenges emerge, priorities change, and technologies evolve.

SITUATIONAL ANALYSIS CAPABILITY SUMMARY

One of the most tangible manifestations of EPA's information management vision and goals is the planned development of a virtual and physical Situation Room. This project links all of the Information Plan's goals since it provides a clear target for the use, acquisition, interpretation, access, and exchange of data as well as the staff skills, information technology, and governance structure needed to establish this capability. Further, the Situation Room relies upon the successful completion of many of the Agency's critical information management and IT projects and policies, such as Information Architecture, CDX, Data Standards, System of Access, Registries, and EPA's Enterprise Repository.

The virtual Situation Room will provide each employee with desktop access to environmental, scientific, financial, and policy information in a single, easy-to-access Web portal that can be tailored for a specific purpose (e.g., writing regulations, assessing risk, issuing permits, emergency response). The physical Situation Room will be a state-of-the-art analysis, communication, and meeting space where Agency analysts and senior decision-makers can anticipate or assess a particular issue or situation, communicate with governmental partners and the public, and craft an appropriate response.

In providing these things, the Situation Room will transform how the Agency and our partners protect the environment and homeland security through data and technology. The Situation Room will:

- make it easy for EPA and its stakeholders to find, review, analyze, and understand environmental conditions and trends at the national, State, and local level;

- improve the ability to detect, prevent, respond to, and inform the public of imminent threats and long-term environmental conditions and trends; and
- increase scientific understanding of synergistic effects and cause-and-effect relationships to improve Agency and partner decision-making and performance reporting.

This effort initially will focus on the timely and compelling issues of emergency response and homeland security, chiefly by delivering information and providing analytical tools to enhance EPA's and its governmental partners' ability to detect, respond to, and prevent terrorist acts, accidental releases, or natural disasters that result in adverse environmental conditions or threats to public health. Subsequent efforts will focus on enhancing environmental information and developing tools and analyses that improve performance assessment and scientific understanding of causal relationships and emerging environmental problems to support the Agency's Environmental Indicators Initiative. OEI will work in close partnership with programs, Regions, and Federal, State, and Tribal partners to design, develop, and operate the Situational Analysis Portal and Room.

Comparing the Information Plan's goals and objectives with the Situation Room's major components⁹ reveals a nexus of eight project themes that must be addressed. These theme areas include both ongoing projects that will be completed or modified to incorporate Situation Room project needs as well as the initiation of new projects.

⁹ The six major components of the Situation Room include:

- Data Needs and Sources;
- Data Acquisition Mechanisms;
- Data Storage;
- Data Display and Analysis;
- Communication and Information Exchange; and
- Project Management

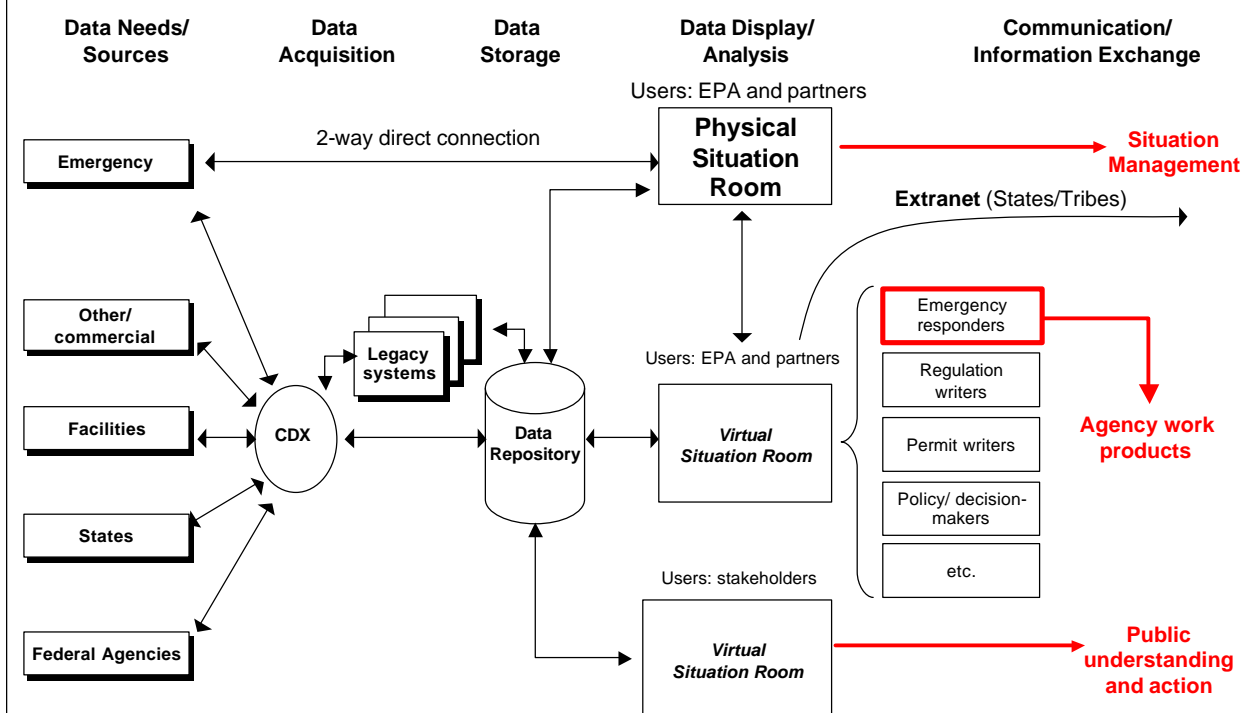
- 1) ***Identify needed data and assess data holdings.*** Assess data needs for the Situation Room and the resulting impact on the Agency's data acquisition strategy. Build on efforts such as the Environmental Indicators Initiative and the Geospatial Blueprint to assess the implications of any new data requirements on reporting burden and on the Central Data Exchange to identify and document data resources in the appropriate data registries, and to develop strategies for acquiring or gaining access to additional needed data.
- 2) ***Assess strategies for ensuring data quality.*** Examine existing resources such as the Data and Information Quality Strategic Plan under development, other Agency information quality guidelines, and the assessment of current error correction processes to determine additional needs for data quality assurance processes or tools.
- 3) ***Assess the Agency enterprise repository and related directories.*** Incorporate all identified data needs into the design of EPA's enterprise repository and ensure that Situation Room needs are reflected in tools such as data registries (e.g., Facility Registry System, Environmental Data Registry, Chemical Registry System) and data standards development efforts.
- 4) ***Assess the Agency's ability to conduct data analyses and to share that information with its partners and stakeholders.*** Assess the information infrastructure implications of the Agency's Environmental Indicators initiative in developing indicators of environmental conditions, trends, and other performance measures.
- 5) ***Assess additional needed data standards and implementation strategies.*** Study and address potential impacts on data acquisition, exchange, and storage.
- 6) ***Identify and enhance critical workforce skill sets.*** Build on previous efforts to inventory existing skills (including a strategy for addressing gaps), modify or develop training programs to address skill needs, and develop strategies for sharing skills and developing skill capabilities. Potentially expand EPA's assessment of the IT competencies of senior managers by extending the study to division directors and technical staff as well as launching a full-scale assessment of IT skills across the Agency.
- 7) ***Assess existing information access and communication mechanisms.*** Examine the usability assessment of EPA's current Web sites to understand how the Situation Room functionality can be included in existing sites and in the Agency's comprehensive public access strategy.
- 8) ***Assess the security implications of the Situation Room on network communications infrastructure.*** Investigate procedures for handling sensitive information in the context of the Situation Room, including elements of data acquisition, storage, public/virtual access, and data exchange.

EPA must undertake a detailed project level planning and development to fully implement the new Situation Room. In addressing these areas, it is recommended that the Agency:

- develop an overarching program management strategy for the Situation Room initiative;
- perform a more detailed assessment of activities already under way in each of the areas;
- appoint project teams and assign areas of responsibility; and
- develop and manage detailed project plans, including timelines and quantifiable outputs, for strategies or portions of strategies that have not yet been addressed.

With continuing management and resource support from senior leadership, EPA will succeed in fulfilling its vision for information management. This top management commitment is essential to the success of this plan and to the successful implementation of EPA's Situation Room.

Figure F
EPA Situational Analysis Capability – Schematic Diagram



CONCLUSION

In recent years, EPA has made significant strides in laying the foundation for an enterprise-wide approach to information management and decision making. Through the formation of OEI and close collaboration with EPA partners and stakeholders, the Agency has made notable progress in developing the organizational capacity, technological infrastructure, and resources necessary to fully use its information as a strategic asset. Yet, given that EPA has traditionally focused on addressing environmental problems one media at a time, much remains to be done to create the type of robust, integrated, and seamless information systems and processes that are needed.

It will be essential for EPA to:

- identify the most critical data and information needed to protect human health and the environment;
- identify and fill data gaps to improve performance-based decision making and data quality;
- develop and implement advanced technologies that will enhance the Agency's efficient collection, use, and dissemination of information;
- develop organizational approaches that make it easier to set enterprise-wide priorities for information and IT investments; and
- measure for results.

Addressing these challenges will require major changes in how EPA uses information and plans, manages, and operates IT. This *Strategic Information Plan* provides an initial blueprint for pursuing some of the areas of greatest concern. With continuing support and commitment from senior leadership, the Agency is poised to pursue its vision of harnessing information and IT to better protect our nation's human health and natural environment.